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## NOTES ON NEW ENGLAND HEPATICAE,—XVI.<sup>1</sup>

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THE difficult genus *Scapania* continues to occupy the attention of European students of the Hepaticae, and many new species have been proposed during recent years. Some of these have been accepted without question, others are now regarded as "small" species, while still others have been reduced to synonymy or to varietal rank. In the present paper one of the most distinct of these recently described species, *S. hyperborea*, is recorded from New England for the first time, and it is probable that others will eventually be discovered. The paper records also another species of *Nardia* from New England (making eight in all), lists a series of additions to local state floras and concludes with a revised census of New England Hepaticae.

1. *NARDIA FOSSOMBRONIOIDES* (Aust.) Lindb. Acta Soc. Sci. Fenn. 10: 530. 1875. *Jungermannia fossombronioides* Aust. Proc. Acad. Philadelphia for 1869: 220. On moist rocks along the Shepaug River, Washington, Connecticut, August 16, 1921 (A. W. E.). New to New England. In 1919 the writer published an illustrated account of this rare species,<sup>2</sup> citing specimens from New Jersey, West Virginia and Illinois. Its discovery in Connecticut extends its known range to the northward, and the following specimens received from Dr. Conklin extend its range to the southward: Winston-Salem, North Carolina, September 5, 1920, P. O. Schallert 36, 43. The plants from the Shepaug River grew in situations which are clearly submerged at certain seasons. When fresh the leaves were

<sup>1</sup> Contribution from the Osborn Botanical Laboratory.

<sup>2</sup> Bryologist 22: 59. f. 1-7. 1919.

decidedly crispate, presenting much the appearance of a *Fossombronina*, and the purple rhizoids increased the resemblance. The only accompanying species was *Marchantia polymorpha*, although *Pellia epiphylla* grew in the near vicinity.

2. SCAPANIA HYPERBOREA Jörgensen, Forh. Vidensk.-Selsk. Christiania 1894<sup>8</sup>: 56. 1894. *S. irrigua* var. *alpina* Bryhn, Nyt Mag. Naturw. 40: 6. 1902 (in part). *Martinellia hyperborea* Arnell & Jensen, Naturw. Unters. Sarekgebietes 3: 97. 1907. On rocks above timber line. Mt. Katahdin, Maine, August 27, 1908 (*A. W. E.*); Mt. Lafayette, New Hampshire, July, 1908 (*A. Lorenz*).<sup>1</sup> New to the North American mainland but previously reported from Greenland by C. Jensen.<sup>2</sup>

This interesting species was first described from male plants collected in Norway. It was overlooked by K. Müller, when he published his monograph of *Scapania* in 1905, but was redescribed two years later by Arnell and Jensen, as indicated in the synonymy. They were able to add an account of the female plant and to cite the species from Sweden, as well as from Norway. In 1915 Müller<sup>3</sup> recognized the validity of *S. hyperborea* as a "kleine Art" and published excellent figures of it. He considers it an arctic species but admits the possibility of its being found on the high mountains of Central Europe. Through the kindness of Dr. Arnell, who has devoted much attention to the European and Siberian species of *Scapania*, the writer has been able to study three Scandinavian specimens of *S. hyperborea*, and these agree in all essential respects with the New England specimens listed above.

The plants grow in dense mats, sometimes in admixture with other Hepaticae, and are distinguished by a brown or reddish brown pigmentation. The somewhat rigid leaves are imbricated and the two lobes, in typical cases at least, arch only slightly or not at all across the stem. The keel is relatively long and is straight or somewhat arched, a narrow entire wing being sometimes present. The dorsal lobe tends to be convex but is sometimes reflexed; it is broadly ovate in outline and usually measures 0.8–1 mm. in length by 0.7–0.9 mm. in width. The apex varies from rounded to bluntly pointed, the margin is entire or vaguely sinuate, and there is little or no decurrence

<sup>1</sup> Listed by Miss Lorenz under the name *S. curta*, Bryologist 11: 114. 1908.

<sup>2</sup> Meddel. om Grönland 43: 166. 1910.

<sup>3</sup> Rabenhorst's Kryptogamen-Flora 6<sup>2</sup>: 415. f. 121. 1915.

at the base. The ventral lobe is plane to slightly convex; it has much the same shape as the dorsal lobe but is somewhat larger, measuring (in well-developed leaves) 1.2–1.5 mm. in length by 1–1.2 mm. in width. The apex and margin are like those of the dorsal lobes but the decurrence tends to be somewhat more marked. The median leaf cells of the lobes measure about  $20 \times 15\mu$  and are marked by large pigmented trigones, usually with bulging sides and often giving the cell-cavities a more or less stellate outline. The cuticle is smooth or nearly so. The gemmae, first described and figured by Müller, are oval bodies, mostly 15–20 $\mu$  in length and 10–15 $\mu$  in width. They occur in dense claret-colored masses and are mostly two-celled, although one-celled gemmae also occur. The lobes of the male bracts are almost equal, and the mouth of the perianth is sparingly toothed; otherwise the sexual plants yield no additional characters of importance.

Jørgensen compared his species with the European *S. crassiretis* Bryhn, but later writers have shown that its true relationship is with *S. irrigua* (Nees) Dumort. and *S. paludicola* Loeske & K. Müll. In both of these species trigones are a characteristic feature of the leaf-cells but are much less conspicuous than in *S. hyperborea*. The species are further distinguished by their yellowish green color, pale gemmae and abruptly pointed leaves, although in *S. irrigua* at least rounded leaves also are of frequent occurrence. The keels of the leaves in *S. irrigua* are much like those of *S. hyperborea*, but those of *S. paludicola* are normally wingless and strongly arched.

Although the distinctions emphasized will usually serve to separate these three species without difficulty, certain European forms have been described which seem to connect *S. hyperborea* with its allies. The most important of these are the following: *S. remota* Kaalaas (1898), *S. irrigua* var. *alpina* Bryhn (1902), and *S. paludicola* var. *Kaalaasi* K. Müll. (1915). Müller regards *S. remota* as a variety of *S. irrigua* and reduces the var. *alpina* to synonymy under it; and he includes under the var. *Kaalaasi* some of the Swedish plants which Arnell and Jensen referred to *S. hyperborea*. In a recent letter from Dr. Arnell he writes that he now regards the var. *alpina* as an aggregate, made up in part of *S. hyperborea* and in part of *S. paludicola*; *S. remota* he considers an unimportant form of *S. irrigua* and the var. *Kaalaasi* as a scarcely more important form of *S. paludicola*. These divergent views clearly indicate that the plants in question are in

need of further study. In the writer's opinion, however, *S. hyperborea* is as worthy of recognition as certain other species of *Scapania* which are accepted without question.

The additions to local state floras, not already mentioned in the preceding pages, are as follows:—

For Maine: *Lunularia cruciata*, Bar Harbor, Mt. Desert (*A. Lorenz*); *Calypogeia fissa*, Seal Harbor, Mt. Desert (*E. L. Rand*); *C. Sullivantii*, Upper Hadlock Pond, Mt. Desert (*A. Lorenz*); *Cephaloziella bifida*, Mt. Katahdin (*A. Lorenz*); *Radula obconica*, Pemetie Mountain Trail, Mt. Desert (*A. Lorenz*); *Scapania paludosa*, Sunken Heath Brook, Mt. Desert (*E. L. Rand*).

For Vermont: *Fossombronina foveolata*, Grand Isle (*A. Lorenz*); *Cephaloziella bifida*, Lunenburg (*A. Lorenz*); *Nardia obovata*, Smuggler's Notch (*A. Lorenz*)<sup>1</sup>; *Plagiochila Austini*, Brandon (*D. L. Dutton*); *Anthoceros crispulus*, Jerico (*A. W. E.*). The Vermont "+" record for *A. punctatus* (see RHODORA 7: 58, 1905) was based on this last material; *A. punctatus* should therefore be marked in the list with a "-" sign.

The census of New England Hepaticae now stands as follows: total number of species recorded, 194; number recorded from Maine, 148; from New Hampshire, 153; from Vermont, 134; from Massachusetts, 121; from Rhode Island, 79; from Connecticut, 146; from all six states, 63.

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## THE GRAY HERBARIUM EXPEDITION TO NOVA SCOTIA, 1920.

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(Continued from p. 278.)

GAYLUSSACIA DUMOSA (Andr.) T. & G., var. BIGELOVIANA Fernald, RHODORA, mii. 99 (1911). Common in boggy barrens and in sphagnum bogs, Yarmouth Co. to Halifax Co.; Cumberland Co.; and collected by others on Cape Breton. See pp. 99, 132, 148.

<sup>1</sup> The earlier Vermont record for this species was based on *N. obscura* (see RHODORA 21: 160. 1919).